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59. (Amended) The flexible thermal control composite of claim 20, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, and the mixtures thereof.

REMARKS

This Revised Amendment and Response is submitted with a Petition to Revive Under 37 C.F.R. §1.137(b) and is responsive to the outstanding Office Action, as required by 37 C.F.R. §1.137(b)(1). This Revised Amendment and Response contains the text of the Amendment filed on behalf of Applicant on December 19, 2001, and includes as an appendix a "Version With Markings Showing Changes Made," as required by 37 C.F.R. §1.121. Applicant respectfully submits that the issue(s) raised in the Notice of Non-Compliant Amendment, initially dated January 4, 2002, have been obviated by the present submission. Applicant hereby adopts and restates the remarks contained in the initial Amendment dated December 19, 2001.

Reconsideration of the above-referenced application in view of the preceeding amendments and the following remarks is respectfully requested.

Claims 1-59 are in this application. Claims 9-16 and claims 41-59 have been amended. A marked-up version of the amended claims is appended hereto.

No new matter has been added.

I. Applicant traverses Examiner's rejection of claims 9-16, 29-36 and 41-59 under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 9-16 have been amended to clearly indicate Applicant's intention to claim "oxidized homopolymers of ethylene polymer compounds." In addition, Applicant annexes hereto excerpts of publicly available information which clearly show that even though the specification may not provide a definition for the term "high molecular weight" there is sufficient information in the public domain that one of ordinary skill in the art would in fact be reasonably apprised of the scope of the invention. In fact, in the art of the invention, high molecular weight typically refers to polymer molecular weights of at least 1000. Very high molecular weight on the other hand, comprises molecular weights of at least one million, as for example TIVAR and SPECTRA.

Claims 29-36 have not been amended in any way, as Examiner did not provide any guidance as to how or why such claims have been rejected under 35 U.S.C. § 112 second paragraph. Accordingly, Applicant respectfully requests that Examiner withdraw such rejection or in the alternative provide a basis for such rejection and additional time to Applicant to respond accordingly.

Claims 41-59 have been amended to render them more definite in accordance with the Examiner's suggestions. In addition, as can be seen from Applicant's excerpts of publicly available information annexed hereto, even though the specification may not provide a specific definition for the term "high density" there is sufficient information both in the specification in the form of the various types of polymers listed and in the public domain that one of ordinary skill in the art would in fact be reasonably apprised of the scope of the invention.

II. Applicant traverses Examiner's Objection to claims 41-59 under 37 C.F.R. § 1.75(c) as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant's amendment to claims 41-59 renders said Objection moot.

III. Applicant traverses Examiner's rejection of claims 1-59 under 35 U.S.C. § 102(b) as being anticipated by Hayes U.S. Patent No. 5,709,914.

Claim 1 is an independent claim. Claims 1-59 are all claims dependent on claim 1. Claim 1 recites that the inventive flexible thermal control composite comprises "an endothermic agent and a polymer, wherein said endothermic agent is distributed, dispersed and suspended within said polymer." (emphasis added)

Applicant's Specification specifically defines the terms "distributed, dispersed and suspended within said polymer" found in claim 1 with the following statement:" These polymers can be photo, thermally or chemically cured. More importantly however, they have a molecular structure consisting of long chains of mostly linear molecules, which after being relaxed by either controlled heating, dissolution or

suspension in a plasticizer or solvent, provide the interstitial spaces, through which the endothermic or thermal storage compounds weave and are distributed prior to curing and the final formation of the PCEA." Specification, p. 71. 23-1. 28. In contrast, Hayes does not disclose any such feature.

Hayes discloses "a fibrous matrix core molded and formed to conform to an outer, supporting, rigid wall. Hayes, col. 2, 1. 37-1. 40. Furthermore, Hayes discloses that the matrix "may be formed from fabric, cloth, metal mesh, batting fiberglass, fiber, dust particles, powder, carbon foam, silica foam, metal foam, hollow particles, KEVLAR . . . fiber, clay, aluminum, copper, perforated metal foils, cellulose materials and microspheres. Hayes col. 3, 1. 17-1. 21. Finally Hayes discloses that the endotherm is attached to the matrix by adhesion, absorption, chemical bonding and the like. Hayes, col. 2, 1. 38- 1.40. Nowhere does Hayes disclose that "the endothermic agent is distributed, dispersed and suspended within said polymer." (emphasis added)

Accordingly, independent claim 1 and claims 2-59 dependent therefrom are neither taught nor disclosed by Hayes.

IV. Applicant traverses Examiner's rejection of claims 1-59 under 35 U.S.C. § 102(b) as being anticipated by Tzar U.S. Patent No. 4,632,865.

Claim 1 is an independent claim. Claims 2-59 are all claims dependent on claim 1. Claim 1 recites that the inventive flexible thermal control composite comprises "an endothermic agent and a polymer, wherein said endothermic agent is distributed, dispersed and suspended within said polymer." (emphasis added)

Applicant's Specification specifically defines the terms "distributed, dispersed and suspended within said polymer" found in claim 1 with the following statement: " These polymers can be photo, thermally or chemically cured. More importantly however, they have a molecular structure consisting of long chains of mostly linear molecules, which after being relaxed by either controlled heating, dissolution or suspension in a plasticizer or solvent, provide the interstitial spaces, through which the endothermic or thermal storage compounds weave and are distributed prior to curing and the final formation of the PCEA." Specification, p. 7 1. 23- 1. 28. In contrast, Tzur does not disclose any such feature.

Tzur discloses the use of " multilayer intumescent-ablators for fire resistant purposes." Tzur, col. 1, 1. 41-1. 43. Such heat and fire resistant protection is for a one time usage. Tzur, col. 5 1. 44-1. 47. Tzur forms its multilayer intumescent ablators through "the incorporation of a strong ablator containing hydrated inorganic salts, combined with an intumescence agent." Tzur, col. 2, 1. 39-1. 41. Tzur discloses that that ablator is formed using a conventional process of rubber production using a low density constituents such as cork combined with an inorganic salt. Tzur, col. 3, 1. 24 -1. 46. Nowhere does Tzur disclose that "the endothermic agent is distributed, dispersed and suspended within said polymer." (emphasis added)

Accordingly, independent claim 1 and claims 2-59 dependent therefrom are neither taught nor disclosed by Tzur.

V. Applicant traverses Examiner's rejection of claims 1-59 under 35 U.S.C. § 102(b) as being anticipated by Buckley U.S. Patent No. 5,722,482.

Claim 1 is an independent claim. Claims 2-59 are all claims dependent on claim 1. Claim 1 recites that the inventive flexible thermal control composite comprises "an endothermic agent and a polymer, wherein said endothermic agent is distributed, dispersed and suspended within said polymer." (emphasis added)

Applicant's Specification specifically defines the terms "distributed, dispersed and suspended within said polymer" found in claim 1 with the following statement:" These polymers can be photo, thermally or chemically cured. More importantly however, they have a molecular structure consisting of long chains of mostly linear molecules, which after being relaxed by either controlled heating, dissolution or suspension in a plasticizer or solvent, provide the interstitial spaces, through which the endothermic or thermal storage compounds weave and are distributed prior to curing and the final formation of the PCEA." Specification, p. 7 1. 23- 1. 28. In contrast, Buckley does not disclose any such feature.

Buckley discloses a phase change material incorporated into a flexible matrix material. Buckley, col. 3, 1. 2-1. 2. The flexible matrix material is preferably a flexible polymer or a polymer foam either open cell or closed cell. Buckley col. 3 1. 65-1. 67; col 4 1. 1. The phase change material may be physically added directly to the matrix material in the form of pellets or particles, as the flexible matrix material is being formed. Buckley col. 4, 1. 11-13. Finally, the phase change material is either encapsulated or is retained onto fibers of polyacrylic or carboxymethyl cellulose before adding them to the matrix to prevent it from migrating or forming one solid inflexible mass as it cools. Buckley col. 4, 1. 11 - 1. 31. see also Buckley preparation processes col. 5-col. 6.

Nowhere does Buckley disclose that "the endothermic agent is distributed, dispersed and suspended within said polymer." (emphasis added)

Accordingly, independent claim 1 and claims 2-59 dependent therefrom are neither taught nor disclosed by Buckley.

VI. Applicant traverses Examiner's rejection of claims 5-8, 11-12, 15-16, 19-20, 25-28, 31-32, 35-36, 39-40, 45-48, 50-51 and 54-55 under 35 U.S.C. § 103(a) as being unpatentable over Tzur.

Claim 1 is an independent claim. Claims 5-8, 11-12, 15-16, 19-20, 25-28, 31-32, 35-36, 39-40, 45-48, 50-51 and 54-55 are all claims either directly or indirectly dependent from claim 1. This means that they incorporate by reference everything in claim 1 and add some further statements, limitations or restrictions. 37 C.F.R. 1.75(c).

Claim 1 recites that the inventive flexible thermal control composite comprises "an endothermic agent and a polymer, wherein said endothermic agent is distributed, dispersed and suspended within said polymer." (emphasis added) Examiner has not found claim 1 as being obvious in view of Tzur. Accordingly, all of the claims dependent therefrom are also not obvious in view of Tzur.

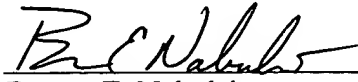
Allowance of claims 1-59 in their present form is thus believed appropriate.

No additional fee is due.

On the basis of the above amendments and remarks, reconsideration and allowance of the application is believed warranted.

Respectfully Submitted,

Dated: February 26, 2003

A handwritten signature in black ink, appearing to read 'B. Nabulsi', is written over a horizontal line.

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VERSION WITH MARKINGS SHOWING CHANGES MADE

9. (Amended) The flexible thermal control composite of claim 1, wherein said endothermic agent is selected from the group consisting of oxidized polymers, unoxidized polymers, oxidized homopolymers of ethylene polymer compounds, unoxidized homopolymers of ethylene polymer compounds, carbon monoxide-bonded copolymers, micronized polyethylene waxes, petroleum derived waxes, ethylene-bis-stearamide, N,N-ethylene-bis-stearamide, tars, high molecular weight oils, high molecular weight hydrocarbons, polyvinyl alcohols, oxidized polyethylene homopolymers, unoxidized polyethylene homopolymers, carnauba wax, aluminum hydroxide, calcium hydroxide, potassium hydroxide, lithium hydroxide, boric acid, paraldehyde, paraformaldehyde, trioxane, lithium formate, lithium acetate, lithium carbonate, calcium carbonate, silicon carbonate, magnesium carbonate, sodium bicarbonate, salts of acetic acid, salts of formic acid, salts of boric acid, lithium chloride trihydrate, lithium nitrate trihydrate, sodium carbonate decahydrate, sodium borate decahydrate, hydrated epsom salts, magnesium nitrate hexahydrate, beryllium sulfate tetrahydrate, sodium phosphate dodecahydrate, calcium chloride hexahydrate, zinc sulfate heptahydrate, magnesium chloride hexahydrate, sodium sulfate decahydrate, aluminum oxide trihydrate, aluminum sulfate decahydrate, aluminum fluoride trihydrate, aluminum nitrate nonhydrate and any eutectic blends of any of these materials [or families of materials] including salts with melting points below 550 degrees Celsius.

10. (Amended) The flexible thermal control composite of claim 2, wherein said endothermic agent is selected from the group consisting of oxidized polymers, unoxidized polymers, oxidized homopolymers of ethylene polymer compounds, unoxidized homopolymers of ethylene polymer compounds, carbon monoxide-bonded copolymers, micronized polyethylene waxes, petroleum derived waxes, ethylene-bis-stearamide, N,N-ethylene-bis-stearamide, tars, high molecular weight oils, high molecular weight hydrocarbons, polyvinyl alcohols, oxidized polyethylene homopolymers, unoxidized polyethylene homopolymers, carnauba wax, aluminum hydroxide, calcium hydroxide, potassium hydroxide, lithium hydroxide, boric acid, paraldehyde, paraformaldehyde, trioxane, lithium formate, lithium acetate, lithium carbonate, calcium carbonate, silicon carbonate, magnesium carbonate, sodium bicarbonate, salts of acetic acid, salts of formic acid, salts of boric acid, lithium chloride trihydrate, lithium nitrate trihydrate, sodium carbonate decahydrate, sodium borate decahydrate, hydrated epsom salts, magnesium nitrate hexahydrate, beryllium sulfate tetrahydrate, sodium phosphate dodecahydrate, calcium chloride hexahydrate, zinc sulfate heptahydrate, magnesium chloride hexahydrate, sodium sulfate decahydrate, aluminum oxide trihydrate, aluminum sulfate decahydrate, aluminum fluoride trihydrate, aluminum nitrate nonhydrate and any eutectic blends of any of these materials [or families of materials] including salts with melting points below 550 degrees Celsius.

11. (Amended) The flexible thermal control composite of claim 5, wherein said micronized endothermic agent is selected from the group consisting of

micronized oxidized polymers, unoxidized polymers, oxidized homopolymers of ethylene polymer compounds, unoxidized homopolymers of ethylene polymer compounds, carbon monoxide-bonded copolymers, micronized polyethylene waxes, petroleum derived waxes, ethylene-bis-stearamide, N,N-ethylene-bis-stearamide, tars, high molecular weight oils, high molecular weight hydrocarbons, polyvinyl alcohols, oxidized polyethylene homopolymers, unoxidized polyethylene homopolymers, carnauba wax, aluminum hydroxide, calcium hydroxide, potassium hydroxide, lithium hydroxide, boric acid, paraldehyde, paraformaldehyde, trioxane, lithium formate, lithium acetate, lithium carbonate, calcium carbonate, silicon carbonate, magnesium carbonate, sodium bicarbonate, salts of acetic acid, salts of formic acid, salts of boric acid, lithium chloride trihydrate, lithium nitrate trihydrate, sodium carbonate decahydrate, sodium borate decahydrate, hydrated epsom salts, magnesium nitrate hexahydrate, beryllium sulfate tetrahydrate, sodium phosphate dodecahydrate, calcium chloride hexahydrate, zinc sulfate heptahydrate, magnesium chloride hexahydrate, sodium sulfate decahydrate, aluminum oxide trihydrate, aluminum sulfate decaoctahydrate, aluminum fluoride trihydrate, aluminum nitrate nonhydrate and any eutectic blends of any of these materials [or families of materials] including salts with melting points below 550 degrees Celsius.

12. (Amended) The flexible thermal control composite of claim 6, wherein said micronized endothermic agent is selected from the group consisting of micronized oxidized polymers, unoxidized polymers, oxidized homopolymers of ethylene polymer compounds, unoxidized homopolymers of ethylene polymer compounds, carbon

monoxide-bonded copolymers, micronized polyethylene waxes, petroleum derived waxes, ethylene-bis-stearamide, N,N-ethylene-bis-stearamide, tars, high molecular weight oils, high molecular weight hydrocarbons, polyvinyl alcohols, oxidized polyethylene homopolymers, unoxidized polyethylene homopolymers, carnauba wax, aluminum hydroxide, calcium hydroxide, potassium hydroxide, lithium hydroxide, boric acid, paraldehyde, paraformaldehyde, trioxane, lithium formate, lithium acetate, lithium carbonate, calcium carbonate, silicon carbonate, magnesium carbonate, sodium bicarbonate, salts of acetic acid, salts of formic acid, salts of boric acid, lithium chloride trihydrate, lithium nitrate trihydrate, sodium carbonate decahydrate, sodium borate decahydrate, hydrated epsom salts, magnesium nitrate hexahydrate, beryllium sulfate tetrahydrate, sodium phosphate dodecahydrate, calcium chloride hexahydrate, zinc sulfate heptahydrate, magnesium chloride hexahydrate, sodium sulfate decahydrate, aluminum oxide trihydrate, aluminum sulfate decaoctahydrate, aluminum fluoride trihydrate, aluminum nitrate nonhydrate and any eutectic blends of any of these materials [or families of materials] including salts with melting points below 550 degrees Celsius.

13. (Amended) The thermal control composite of claim 3, wherein said recyclable endothermic agent is selected from the group consisting of oxidized polymers, unoxidized polymers, oxidized homopolymers of ethylene polymer compounds, unoxidized homopolymers of ethylene polymer compounds, carbon monoxide-bonded copolymers, micronized polyethylene waxes, petroleum derived waxes, ethylene-bis-stearamide, N,N-ethylene-bis-stearamide, tars, high molecular weight oils, high molecular

weight hydrocarbons, polyvinyl alcohols, oxidized polyethylene homopolymers, unoxidized polyethylene homopolymers, carnauba wax, glycerin, glycol, and glycerin/glycol hydrated salts and any eutectic blends of any of these materials [or families of materials] including salts with melting points below 550 degrees Celsius.

14. (Amended) The thermal control composite of claim 4, wherein said recyclable endothermic agent is selected from the group consisting of oxidized polymers, unoxidized polymers, oxidized homopolymers of ethylene polymer compounds, unoxidized homopolymers of ethylene polymer compounds, carbon monoxide-bonded copolymers, micronized polyethylene waxes, petroleum derived waxes, ethylene-bis-stearamide, N,N-ethylene-bis-stearamide, tars, high molecular weight oils, high molecular weight hydrocarbons, polyvinyl alcohols, oxidized polyethylene homopolymers, unoxidized polyethylene homopolymers, carnauba wax, glycerin, glycol, and glycerin/glycol hydrated salts and any eutectic blends of any of these materials [or families of materials] including salts with melting points below 550 degrees Celsius.

15. (Amended) The thermal control composite of claim 7, wherein said recyclable, micronized, endothermic agent is selected from the group consisting of oxidized polymers, unoxidized polymers, oxidized homopolymers of ethylene polymer compounds, unoxidized homopolymers of ethylene polymer compounds, carbon monoxide-bonded copolymers, micronized polyethylene waxes, petroleum derived waxes, ethylene-bis-stearamide, N,N-ethylene-bis-stearamide, tars, high molecular weight oils,

high molecular weight hydrocarbons, polyvinyl alcohols, oxidized polyethylene homopolymers, unoxidized polyethylene homopolymers, carnauba wax, glycerin, glycol, and glycerin/glycol hydrated salts and any eutectic blends of any of these materials [or families of materials] including salts with melting points below 550 degrees Celsius.

16. (Amended) The thermal control composite of claim 8, wherein said recyclable, micronized endothermic agent is selected from the group consisting of oxidized polymers, unoxidized polymers, oxidized homopolymers of ethylene polymer compounds, unoxidized homopolymers of ethylene polymer compounds, carbon monoxide-bonded copolymers, micronized polyethylene waxes, petroleum derived waxes, ethylene-bis-stearamide, N,N-ethylene-bis-stearamide, tars, high molecular weight oils, high molecular weight hydrocarbons, polyvinyl alcohols, oxidized polyethylene homopolymers, unoxidized polyethylene homopolymers, carnauba wax, glycerin, glycol, and glycerin/glycol hydrated salts and any eutectic blends of any of these materials [or families of materials] including salts with melting points below 550 degrees Celsius.

41. (Amended) The flexible thermal control composite of claim 1, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates,

polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

42. (Amended) The flexible thermal control composite of claim 2, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

43. (Amended) The flexible thermal control composite of claim 3, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides,

[polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

44. (Amended) The flexible thermal control composite of claim 4, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

45. (Amended) The flexible thermal control composite of claim 5, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

46. (Amended) The flexible thermal control composite of claim 6, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

47. (Amended) The flexible thermal control composite of claim 7, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

48. (Amended) The flexible thermal control composite of claim 8, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

49. (Amended) The flexible thermal control composite of claim 10, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

50. (Amended) The flexible thermal control composite of claim 11, wherein said polymer is selected from the group of polymers consisting of latexes,

fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

51. (Amended) The flexible thermal control composite of claim 12, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

52. (Amended) The flexible thermal control composite of claim 13, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones,

polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

53. (Amended) The flexible thermal control composite of claim 14, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

54. (Amended) The flexible thermal control composite of claim 15, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates,

polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

55. (Amended) The flexible thermal control composite of claim 16, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

56. (Amended) The flexible thermal control composite of claim 17, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides,

[polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

57. (Amended) The flexible thermal control composite of claim 18, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

58. (Amended) The flexible thermal control composite of claim 19, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

59. (Amended) The flexible thermal control composite of claim 20, wherein said polymer is selected from the group of polymers consisting of latexes, fluoropolymers, expanded fluoropolymers, fluoroelastomers, elastomers polyimides, polyesters, high density polymers, polyamides, polyarylates, polyetherimides, polyketones, polyphenylene oxides, polyphenylene sulfides, polyphenylsulfones, polysulfones, acetals, nylons, ABS, polyetheretherketones, phenolics, polystyrenes, polycarbonates, polyethylenes, polypropylenes, acrylics, polyurethanes, polyvinyls, polyvinylchlorides, [polymeric, plastic materials well known to those skilled in the art of thermoprotective materials] and the mixtures thereof.

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p. 2
P.02

A-C Polyethylenes & Copolymers

Typical Properties

	Meltin Drop Point (ASTM D-3954)	Hardness, durometer (ASTM D-5)	Density, g/cc (ASTM D-1505)	Viscosity, cps @ 140°C (Standard)	Acid Number, mg KOH/g (ASTM D-1386)	Physical Form
Homopolymers						
AC 6, 6A	106°C	223°F	4.0	0.92	375	Prills, Powder
AC 7, 7A	109°C	228°F	2.5	0.92	450	Prills, Powder
AC 8, 8A	113°C	235°F	1.0	0.93	450	Prills, Powder
AC 9, 9A, 9F	115°C	239°F	0.5	0.93	450	Prills, Powder, Fine Powder
AC 16, 16A	102°C	216°F	5.5	0.91	525	Prills
AC 617, 617A	101°C	214°F	7.0	0.91	180	Prills, Powder
AC 715	109°C	228°F	2.5	0.92	4000	Diced
AC 725	110°C	230°F	3.5	0.92	1400	Diced
AC 735	110°C	230°F	2.5	0.92	6000	Diced
AC 810A	121°C	250°F	1.0	0.95	20	Powder
AC 820A	126°C	259°F	<0.5	0.96	80	Powder
AC 1702	90°C	194°F	98.0%	0.88	30	Grease-like
Oxidized Homopolymers						
AC 629, 629A	101°C	214°F	5.5	0.93	200	Prills, Powder
AC 655	107°C	225°F	2.5	0.93	210	Prills
AC 656	98°C	208°F	9.0	0.92	185	Prills
AC 673A, 673P	110°C	230°F	<1.0	0.95	400	Powder, Pastilles
AC 680	108°C	226°F	1.5	0.93	250	Prills
AC 6702	88°C	190°F	90.0%	0.85	35	Grease-like
High-Density Oxidized Homopolymers						
AC 307, 307A	140°C	284°F	<0.5	0.98	85000 (@150°C)	Granule, Powder
AC 316, 316A	140°C	284°F	<0.5	0.98	8500 (@150°C)	Granule, Powder
AC 325	136°C	277°F	<0.5	0.99	4400 (@150°C)	Granule
AC 330	137°C	279°F	<0.5	0.99	3600 (@150°C)	Granule
AC 392	138°C	280°F	<0.5	0.99	4500 (@150°C)	Granule
AC 395, 395A	137°C	279°F	<0.5	1.00	2500 (@150°C)	Granule, Powder
Copolymers/Ethylene-Acrylic Acid						
AC 540, 540A	105°C	221°F	2.0	0.93	575	Prills, Powder
AC 580	95°C	203°F	4.0	0.94	650	Prills
AC 5120	92°C	198°F	8.0	0.94	650	Prills
Copolymers/Ethylene-Vinyl Acetate						
AC 400, 400A	92°C	198°F	0.5	0.92	595	13% Vinyl Acetate Prills, Powder
AC 405(S)	94°C	201°F	7.0	0.92	600	11% Vinyl Acetate Prills
AC 405(M)	100°C	212°F	5.0	0.92	600	8% Vinyl Acetate Prills
AC 405(T)	102°C	216°F	4.0	0.92	600	6% Vinyl Acetate Prills
Oxidized Copolymer						
AC 645P	100°C	212°F	5.0	0.94	564 (Sop. No.)	13 Pastille
AClyn® Low Molecular Weight Ionomers						
AClyn 201	102°C	215°F	Co	42	5,500	Granule, Powder
AClyn 240	95°C	203°F	Mg	NH	7,000	Granule, Powder
AClyn 285	82°C	180°F	Na	20	80,000	Granule, Powder
AClyn 295	99°C	210°F	Zn	NG	4,500	Granule, Powder

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Oct 08 01 02:40p

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2993449

p.3
P.03

Oct-08-01 16:47

Melting Point, °C (ASTM D-3954)	Hardness, durometer (ASTM D-5)	Density, g/cc (ASTM D-1505)	Viscosity @ 140°C (Brookfield)	Specific Heat eq. KJ/kg/°C	Physical Form	
Modified Olefin Products						
Ethylene Maleic Anhydride Copolymers						
A-C 573A, 573P 106°C	223°F	4.5	0.92	600	5	Powder, Pellets
A-C 575A, 575P 106°C	223°F	4.5	0.92	>1000	35	Powder, Pellets
Propylene Maleic Anhydride Copolymers						
A-C 596A, 596P 143°C	290°F	<0.5	0.94	<400@190°C	43	Powder, Pellets
A-C 597A, 597P 143°C	290°F	<0.5	0.94	500@190°C	80	Powder, Pellets
A-C 950P 153°C	307°F	<0.5	0.93	2000@190°C	43	Pellets
A-C 1221P 150°C	302°F	<0.5	0.93	800@190°C	45	Pellets
Polypropylene Homopolymers						
A-C 1089 146°C	295°F	<0.5	0.91	45@190°C	Nil	Powder
A-C 1172 150°C	302°F	<0.5	0.91	1900@190°C	Nil	Powder

ACumist[®] Micronized Polyolefin Waxes

Melting Point (ASTM D-3954)	Hardness, durometer (ASTM D-5)	Density, g/cc (ASTM D-1505)	Avg. Particle Size microns	Add Number mg/kg (ASTM D-1344-85)	Physical Form
PE Micronized Waxes					
ACumist A-6 137°C	279°F	<0.5	0.99	6	26-40 Micronized Powder
ACumist A-12 137°C	279°F	<0.5	0.99	12	26-40 Micronized Powder
ACumist A-18 137°C	279°F	<0.5	0.99	18	26-40 Micronized Powder
ACumist A-45 137°C	279°F	<0.5	0.99	45	26-40 Micronized Powder
ACumist B-6 126°C	259°F	<0.5	0.96	6	Nil Micronized Powder
ACumist B-9 126°C	259°F	<0.5	0.96	9	Nil Micronized Powder
ACumist B-12 126°C	259°F	<0.5	0.96	12	Nil Micronized Powder
ACumist B-18 126°C	259°F	<0.5	0.96	18	Nil Micronized Powder
ACumist C-3 121°C	250°F	1.0	0.95	3	Nil Micronized Powder
ACumist C-12 121°C	250°F	1.0	0.95	12	Nil Micronized Powder
ACumist C-18 121°C	250°F	1.0	0.95	18	Nil Micronized Powder
ACumist D-5 118°C	244°F	1.5	0.95	5	Nil Micronized Powder
ACumist D-9 118°C	244°F	1.5	0.95	9	Nil Micronized Powder
ACumist E-6 113°C	235°F	1.0	0.94	6	Nil Micronized Powder
ACumist E-12 113°C	235°F	1.0	0.94	9	Nil Micronized Powder
PTFE Micronized Wax Blends ¹					
ACumist 3105 121°C	250°F	1.0	0.98	5	Nil Micronized Powder
ACumist 3205 121°C	250°F	<0.5	0.98	5	Nil Micronized Powder
ACumist 3305 121°C	250°F	<0.5	1.1	5	Nil Micronized Powder
PI Micronized Waxes					
ACumist 1106 113°C	235°F	1.0	0.94	6	Nil Micronized Powder
ACumist 1109 113°C	235°F	1.0	0.94	9	Nil Micronized Powder
ACumist 1112 113°C	235°F	1.0	0.94	9	Nil Micronized Powder
ACumist 1204 113°C	235°F	1.0	0.94	7	Nil Micronized Powder
ACumist 1306 114°C	237°F	<0.5	0.94	6	Nil Micronized Powder
ACumist 1309 114°C	237°F	<0.5	0.94	4	Nil Micronized Powder

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Notes

Note 1: Melt Point listed is the initial melt point of the PE Wax only. PTFE does not melt but softens above 115°F.

Note 2: Determined by Differential Scanning Calorimetry.

Note 3: A-C[®] designation on A-C[®] products which is unapproved or discontinued.

Note 4: Specifications are by PCE/PI

Note 5: ASTM D-1321

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Oct 08 01 02:40p vercingetorix
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2993449 P.4

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Material Safety Data Sheet

A-C® Polyethylene Homopolymers

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: A-C 3A, 6, 6A, 6S, 7, 7A, 7AS, 8, 8A, 9, 9A, 9CP, 9F, 16, 16A, 617, 617A, 617G, 715, 725, 735, 1702.

OTHER/GENERIC NAMES: Polyethylene Homopolymers

PRODUCT USE: Multiple uses in many applications.

MANUFACTURER: Honeywell International
Specialty Wax and Additives
101 Columbia Rd., P.O. Box 1053
Morrisown, NJ 07962-1053

FOR MORE INFORMATION CALL:
(Monday-Friday, 9:00am-4:30pm)
973-455-4414

IN CASE OF EMERGENCY CALL:
(24 Hours/Day, 7 Days/Week)
800-424-9300 (CHEMTREC)
973-455-2000

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CASE #	WEIGHT %
Polyethylene	9002-88-4	~ 100

Trace impurities and additional material names not listed above may also appear in the Regulatory Information section (#15) towards the end of the MSDS. These materials may be listed for local "Right to Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: A-C 1702 is grease-like. All others are white waxy solids in pellet, prill, or powder form. Powdered material in air may form an explosive mixture. No other significant immediate health, physical, or environmental hazards are associated with these materials.

POTENTIAL HEALTH HAZARDS:

SKIN: Mild dermal irritant.

EYES: Non-eye irritant. Particulates may cause mechanical irritation.

MSDS Number: ACPA0003
Current Issue Date: 2/01

Page 1 of 7



Oct 08 01 02:40p vercingetorix
OCT-08-2001 15:50 HONEYWELL

2993449 P.5

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Material Safety Data Sheet

A-C® Polyethylene Homopolymers

INHALATION: Treat powder as nuisance particulates.

INGESTION: No effects known. Low toxicity.

DELAYED EFFECTS: None known.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

Ingredient Name	NTP Status	IARC Status	OSHA List
* No ingredients listed in this section *			

4. FIRST AID MEASURES

SKIN: Wash with water and soap.

EYE: Wash with water for 15 minutes. If irritation persists, consult physician.

INHALATION: For inhalation of powder, remove to fresh air.

INGESTION: Not expected to occur.

ADVICE TO PHYSICIAN: No specific advice. Treat according to symptoms present.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	> 445°F (> 230°C)
FLASH POINT METHOD:	Open cup.
AUTOIGNITION TEMPERATURE:	None known.
UPPER FLAME LIMIT (Volume % in air):	Not applicable.
LOWER FLAME LIMIT (Volume % in air):	Not applicable.
FLAME PROPAGATION RATE (Solids):	Unknown.
OSHA FLAMMABILITY CLASS:	Combustible solid.

EXTINGUISHING MEDIA:

Carbon dioxide, dry chemical or fine water spray. Avoid water stream on molten burning material as it may scatter and spread the fire.

A-C[®] Polyethylene Homopolymers

FIRE AND EXPLOSION HAZARDS:
Fire point $> 313^{\circ}\text{C}$. Melts in proximity to foci causing slippery floors and stairs. Static charges on powders or powders in liquids may ignite combustible atmospheres. See NFPA Bulletin 654, "Prevention of Fires and Dust Explosions in the Chemical, Dye, Pharmaceutical, and Plastics Industries" for safe handling procedures.

SPECIAL FIREFIGHTING PRECAUTIONS/INSTRUCTIONS:
Wear self-contained breathing apparatus approved by NIOSH. Watch footing on floors and stairs because of possible melting and spreading of material. Use water spray to keep containers cool.

IN CASE OF SPILL OR OTHER RELEASES: (Always wear recommended personal protective equipment.)
Remove ignition sources from the powdered grades. Keep away from heat or flame. Sweep up with a minimum of dusting.
Collect in container, e.g. fiberboard drum or carton.

Spills and releases may have to be reported to Federal and/or local authorities. See the Regulatory Information section (#15) regarding reporting requirements.

NORMAL HANDLING: (Always wear recommended personal protective equipment.)
Avoid breathing fumes from heating operations. Avoid spillage which can cause very slippery conditions on floors. Use good personal hygiene and housekeeping.

AGE RECOMMENDATIONS:
Avoid excessive heat. Do not store near strong oxidizing agents.

WORKING CONTROLS:
Use adequate ventilation during heating processes, or if dusty conditions prevail when handling powdered materials. For storage and ordinary handling, general ventilation is adequate.

PROTECTION:
Protective garments, i.e. gloves with long sleeves, when handling molten material.

Material Safety Data Sheet

A-C^{*} Polyethylene Homopolymers

EYE PROTECTION:

Chemical goggles around molten material and in dusty conditions.

RESPIRATORY PROTECTION:

Use a NIOSH approved dust respirator with powdered grades if dusty conditions prevail.
During melting or conveying in molten state, use an organic vapor respirator.

ADDITIONAL RECOMMENDATIONS:

Not generally required.

EXPOSURE GUIDELINES:

(Guidelines exist for the following ingredients)

Ingredient Name

ACGIH TLV

OSHA PEL

Other Limit

* No ingredients listed in this section *

- * = Limit established by Honeywell International
- ** = Workplace Environmental Exposure Level (AIHA)
- *** = Biological Exposure Index

Other exposure limits for the decomposition products normally associated with product use are as follows:

Powdered forms may generate nuisance particulates upon handling: ACGIH TLV = 10 mg/m³ of total particulates.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:

A-C 1702 is grease-like; other grades are white pellets, pills, or powder.

PHYSICAL STATE:

Solid.

ODOR:

Characteristic waxy odor.

SPECIFIC GRAVITY:

(Water = 1.0) 0.88 - 0.97

SOLUBILITY IN WATER:

(Weight %) Negligible

pH:

Not applicable.

BOILING POINT:

Not applicable.

MELTING POINT:

92 - 122°C (198 - 252°F)

VAPOR PRESSURE:

Not applicable.

VAPOR DENSITY:

(Air = 1.0) Not applicable.

EVAPORATION RATE:

Not applicable. Compared to: Not applicable.

% VOLATILES:

Not applicable.

FLASH POINT:

> 445° (> 230°C)

(Flash point method and additional flammability data are found in Section 5.)

Material Safety Data Sheet

A-C[®] Polyethylene Homopolymers

10. STABILITY AND REACTIVITY

NORMALLY STABLE? (Conditions to Avoid)
Stable at normal conditions.

INCOMPATIBILITIES:
Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS:
Depending on conditions of fire, CO, CO₂, and combustible gases may be generated.

HAZARDOUS POLYMERIZATION?
Will not occur.

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:
Acute oral toxicity in rats: LD₅₀ > 2000 mg/kg.

DELAYED (SUBCHRONIC & CHRONIC) EFFECTS:
Not determined.

OTHER DATA:
No other data developed.

12. ECOLOGICAL INFORMATION

No data have been developed on this subject. These polymeric products are not soluble in water. They are not considered biodegradable.

13. DISPOSAL CONSIDERATIONS

RCRA:
Is the unused product a RCRA hazardous waste if discarded? No.
If yes, the RCRA ID number is:

Material Safety Data Sheet

A-C[®] Polyethylene Homopolymers

OTHER DISPOSAL CONSIDERATIONS: Discard as non-hazardous organic solid waste.

The information offered here is for the product as shipped. Use and/or alteration to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

14. TRANSPORT INFORMATION

US DOT HAZARD CLASS: Not regulated.

US DOT ID NUMBER: Not applicable.

For additional information on shipping regulations affecting this material, contact the information number found on the first page.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA):

TSCA INVENTORY STATUS: Products are listed on the TSCA Chemical Inventory.

OTHER TSCA ISSUES: None.

SARA TITLE III/CERCLA:

RQs & TPQs

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

Ingredient	SARA/CERCLA RQ (lbs)	SARA EHS TPQ (lbs)
------------	-------------------------	-----------------------

* No ingredients listed in this section *

Spills/releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center (1-800-424-8802) and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: None

SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 "Toxic Chemicals". CAS #'s and wt. % are found in section #2.

Ingredient	Comments
------------	----------

* No ingredients listed in this section *

Oct 08 01 02:41p vercingetorix
OCT-08-2001 15:51 HONEYWELL

2993449 9734556134 P. 10

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Material Safety Data Sheet

A-C[®] Polyethylene Homopolymers

STATE RIGHT TO KNOW:

In addition to the ingredients found in Section 2, the following are listed for state right-to-know purposes:

Ingredient	Wt. %	Comment
* No ingredients listed in this section *		

ADDITIONAL REGULATORY INFORMATION:

See Allied Technical Data Bulletin GEN-002 for FDA related information.

WHMIS CLASSIFICATION (CANADA):

Not subject to WHMIS regulations.

FOREIGN INVENTORY STATUS:

- Canadian DSL (Domestic Substances List)
- EINECS (European Inventory of Existing Commercial Chemical Substances)
- Australian Chemical Inventory
- Japanese Chemical Inventory (ENCS)
- Korean Inventory
- Philippine Inventory (PICCS)
- Chinese Inventory (draft)

16. OTHER INFORMATION

CURRENT ISSUE DATE: 2/01
PREVIOUS ISSUE DATE: 2/00

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:
Removed A-C 810A and 820A, and put on separate MSDS.

OTHER INFORMATION: None

MSDS Number: ACPA0003
Current Issue Date: 2/01

Page 7 of 7

TOTAL P.07



Oct 08 01 02:41p

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p. 11



POLYETHYLENE HOMOPOLYMERS

PRODUCT SAFETY
DATA SHEET

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME)

A-C*3A(6, 6A, 7, 7A, 8, 8A, 9, 9A, 9F, 15, 16, 20, 617, 617A, 617G, 712, 715, 725, 735 and 1702 Polyethylene

☒ C.A.S. NO.☐ ALLIED PRODUCT CODE #

9002-88-4

CHEMICAL NAME AND/OR SYNONYM

Polyethylene

FORMULA

 $(C_2H_4)_n$

MOLECULAR WEIGHT

Polymeric > 1100

Allied-Signal Inc.
A-C Performance Additives
P.O. Box 2332R
Morristown, N.J. 07962-2332

ADDRESS (Rt., STREET, CITY, STATE AND ZIP CODE)

CONTACT

Product Safety

PHONE NUMBER

(201) 455-4414

LAST ISSUE DATE

August, 1989

CURRENT ISSUE DATE

March, 1990

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER

(201) 455-2000

INHALATION: (of powder) - Remove to fresh air.

EYES: Eye contact mechanical irritation: Wash with water 15 minutes.
If irritation persists, consult physician.

C. HAZARDS INFORMATION

HEALTH

IRRITATION

Treat powdered grades as nuisance particulates. Avoid breathing fumes from molten material.

INGESTION

No effects known. Acute oral toxicity in rats: LD₅₀ > 2000 mg/kg.

SKIN

Mild dermal irritant.

EYES

Non-eye irritant. Dust may cause mechanical irritation.

PERMISSIBLE CONCENTRATION: AIR
(SEE SECTION D)Powdered grades: recommend using the 1988-89 value established for nuisance particulates (10 mg/m³ of total particulate).

BIOLOGICAL

None established

UNUSUAL CHRONIC TOXICITY

No known hazards associated with the customary industrial use of these products.

Oct. 08 01 02:41p

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2993449

p. 12

C. HAZARDS (CONT.)**FIRE AND EXPLOSION**

FLASH POINT	> 231 °C	AUTO IGNITION TEMPERATURE	°C	FLAMMABLE LIMITS IN AIR (% BY VOL.)
<input checked="" type="checkbox"/> OPEN CUP	<input type="checkbox"/> CLOSED CUP	None known		LOWER - NA UPPER - NA
UNUSUAL FIRE AND EXPLOSION HAZARDS				
Fire point > 313°C. Melts in proximity to fires causing slippery floors and stairs. Static charges on powders or powders in liquids may ignite flammable atmospheres. Refer to Bulletin 654 for safe handling procedures (see Section J).				

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS - RECOMMENDED
Carbon dioxide, dry chemical or fine water spray.
FIRE EXTINGUISHING AGENTS TO AVOID
Water stream on molten burning material may scatter and spread fire.
SPECIAL FIRE FIGHTING PRECAUTIONS
Wear self-contained breathing apparatus approved by NIOSH. Watch footing on floors and stairs because of possible melting and spreading. Use spray to keep containers cool.
VENTILATION
Use adequate ventilation during heating processes or if dusty conditions prevail when handling powders. For storage and ordinary handling, general ventilation is adequate.
NORMAL HANDLING
Avoid breathing fumes from heating operations. Very slippery on floors, avoid spillage. Use good personal hygiene and housekeeping.
STORAGE
Avoid excessive heat.
SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT - SECTION E)
Remove ignition sources from the powdered grades. Keep away from heat or flame. Sweep up with a minimum of dusting. Collect in container, e.g., fiberboard drum or carton.
SPECIAL PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS
None
SIGNAL WORD -
NA

E. PERSONAL PROTECTIVE EQUIPMENT

RESPIRATORY PROTECTION
Use a NIOSH approved dust respirator for powdered grades when dusty conditions prevail. During melting or conveying in molten state use an organic vapor respirator.
EYES AND FACE
Chemical goggles around molten material and in dusty conditions.
HANDS, ARMS, AND BODY
Protective garments around molten material.
OTHER CLOTHING AND EQUIPMENT
Protective garments around molten material.

Oct 08 01 02:42p

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p. 13

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS): <input type="checkbox"/> LIQUID <input checked="" type="checkbox"/> SOLID <input type="checkbox"/> GAS <input type="checkbox"/>		APPEARANCE AND ODOR A-C* 1702 grease-like. All others white, waxy solid in pellets, pills or powder. Characteristic waxy odor.	
BOILING POINT	NA °C	SPECIFIC GRAVITY (H ₂ O = 1)	VAPOR DENSITY (AIR = 1)
MELTING POINT	(Soft. Pt.) 92-117 °C	Solid 0.88 - 0.94	NA
SOLUBILITY IN WATER (% by Weight) Negligible		pH NA	VAPOR PRESSURE (mm Hg at 20°C) <input type="checkbox"/> (PSIG) <input type="checkbox"/> Negligible @ ambient
EVAPORATION RATE (Butyl Acetate = 1) <input type="checkbox"/> (Ether = 1) <input type="checkbox"/> NA		% VOLATILES BY VOLUME (At 20°C) NA	

G. REACTIVITY DATA

STABILITY <input type="checkbox"/> UNSTABLE <input checked="" type="checkbox"/> STABLE		CONDITIONS TO AVOID Excessive heat. A-C 1702 starts breaking down at temperatures over 100 °C; other products are more stable. Avoid direct contact with open flame.
INCOMPATIBILITY (MATERIALS TO AVOID) Strong oxidizing agents, although comparatively stable as are other polyethylenes.		
HAZARDOUS DECOMPOSITION PRODUCTS Depends on condition of fire. CO, CO ₂ and combustible gases may be generated.		
HAZARDOUS POLYMERIZATION <input type="checkbox"/> MAY OCCUR <input checked="" type="checkbox"/> WILL NOT OCCUR		CONDITIONS TO AVOID None

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT / C.A.S. #	ppm	HAZARD DATA (SEE SECT. J)
NA mp 197.6°F — 242°F	NA	NA

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p. 14

DEGRADABILITY/AQUATIC TOXICITY		OCTA WATER PARTITION COEFFICIENT	
Not considered biodegradable or toxic.		NA (Insoluble in Water)	
EPA HAZARDOUS SUBSTANCES (CLEAN WATER ACT SEC. 311) <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		IF SO REPORTABLE QUANTITY: _____	
WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)		40 CFR 116-117	
Discard as non-hazardous organic solid waste.			
RCRA STATUS OF UNUSED MATERIAL IF DISCARDED		HAZARDOUS WASTE NUMBER: (IF APPLICABLE)	
Non-hazardous		40 CFR 261.22	

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES	
TLV: ACGIH List, 1988-89.	
REGULATORY STANDARDS	D.O.T. CLASSIFICATION: Not Regulated
Some states regulate the discharge of polyethylene polymers to streams. FDA: Allied Technical Data Bulletin GEN-002.	
49 CFR 173	
GENERAL	
National Fire Protection Association Bulletin ANSI/NFPA 654 "Prevention of Fire and Dust Explosions in the Chemical, Dye, Pharmaceutical, and Plastics Industries", 1988 Edition	

K. ADDITIONAL INFORMATION

Fire: Allied Technical Data Bulletin: Cleveland Open Cup Flash & Fire Points. (ASTM D92-72)	
Typical Properties: Allied Technical Data Bulletin (GEN-001).	
- These products are included in the TSCA Chemical Substance Inventory.	
- HMIS Code:	
Health	0
Flammability	1
Reactivity	0
- Under the criteria established for hazardous chemicals in the OSHA Hazardous Communication Act and SARA Title III, these materials are considered non-hazardous. They do not contain Extremely Hazardous Substances (Section 302) or Toxic Chemicals (Section 313).	

MSPE 7

THIS PRODUCT SAFETY DATA SHEET IS OFFERED SOLELY FOR YOUR INFORMATION, CONSIDERATION AND INVESTIGATION.

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Oct 08 01 02:43p

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p.15

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Material Safety Data Sheet

A-C® Oxidized Polyethylene Homopolymers

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: A-C® 307, 307A, 316, 316A, 325, 330, 392, 395, 395A, 629, 629A, 629P, 655, 656, 659, 660, 673A, 673P, 680, 680A, 6702

OTHER/GENERIC NAMES: Oxidized Polyethylene Homopolymers

PRODUCT USE: Multiple uses in many applications.

MANUFACTURER: Honeywell International
Specialty Wax and Additives
101 Columbia Rd., P.O. Box 1053
Morristown, NJ 07962-1053

FOR MORE INFORMATION CALL:
(Monday-Friday, 9:00am-4:30pm)
973-455-4414

IN CASE OF EMERGENCY CALL:
(24 Hours/Day, 7 Days/Week)
800-424-9300 (CHEMTREC)
973-455-2000

2. COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT NAME	CAS #	WEIGHT %
Oxidized Polyethylene	68441-17-8	- 100

Trace impurities and additional material names not listed above may also appear in the Regulatory Information section (#15) towards the end of the MSDS. These materials may be listed for local "Right to Know" compliance and for other reasons.

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: A-C 6702 is grease-like. All other products are white waxy solids in pellet, prill, or powder form. Powdered material in air may form an explosive mixture. No other significant immediate health, physical, or environmental hazards are associated with these materials.

POTENTIAL HEALTH HAZARDS:

SKIN: Negligible dermal irritant.

MSDS Number: ACPA0004
Current Issue Date: 2/00

Page 1 of 7

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Oct 08 01 02:43p

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p. 16

P.O. Box 1039
Morristown, NJ 07962-1039**A-C Polyethylene****316A**

Specification No.: 303161227

Date: 11/93

Material Specifications

Item	Allied Test Method	Specifications
Acid Number	YMP-QCL-006	15-18 mg KOH/g
Particle Size through 40 mesh (sieve inner width: 420 micron)	309-OR	100%

Average Analysis of Standard Production

Drop Point, Mettler	140°C (284°F)
Density	0.98 g/cc
Viscosity @ 150°C (302°F) Brookfield	8500 cps
Hardness @ 25°C (77°F)	<0.5 dmm
Bulk Density	529 kg/m ³ (33 lb/ft ³)

Product Form and Packaging

Product is supplied as a white to off-white powder, essentially free of foreign material. It is packaged in 25 kg four-ply Kraft bags and shipped on pallets, 40 bags to a pallet, net weight 1,000 kgs, and stretch-wrapped. Pallet loads are approximately 1.32m long, 1.04m wide, and 1.29m high (52 inches x 42 inches x 51 inches)

Safety Precautions

A-C® polyethylenes and copolymers are regarded as non-hazardous when exposure is controlled by using accepted industrial hygiene practices. Consult our Material Safety Data Sheet for specific recommendations on safe handling.

Additional Information

To place an order, obtain prices, samples and technical information, please refer to the address list on the back of this sheet for the office serving your area.

Honeywell

Material Safety Data Sheet

A-C® Oxidized Polyethylene Homopolymers

EYES: Non-eye irritant. Particulates may cause mechanical irritation.

INHALATION: Treat powder as nuisance particulates.

INGESTION: No effects known. Low toxicity.

DELAYED EFFECTS: None known.

Ingredients found on one of the OSHA designated carcinogen lists are listed below.

Ingredient Name	NTP Status	IARC Status	OSHA List
* No ingredients listed in this section *			

4. FIRST AID MEASURES

SKIN: Wash with water and soap.

EYE: Wash with water for 15 minutes. If irritation persists, consult physician.

INHALATION: For inhalation of powder, remove to fresh air.

INGESTION: Not expected to occur.

ADVICE TO PHYSICIAN: No specific advice. Treat according to symptoms present.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	> 400°F (> 255°C)
FLASH POINT METHOD:	Open cup.
AUTOIGNITION TEMPERATURE:	None known.
UPPER FLAME LIMIT (Volume % in air):	Not applicable.
LOWER FLAME LIMIT (Volume % in air):	Not applicable.
FLAME PROPAGATION RATE (Solids):	Unknown.
OSHA FLAMMABILITY CLASS:	Combustible solid.

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Material Safety Data Sheet

A-C* Oxidized Polyethylene Homopolymers

EXTINGUISHING MEDIA:

Carbon dioxide, dry chemical or fine water spray. Avoid water stream on molten burning material as it may scatter and spread the fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

Fire point > 313°C. Melts in proximity to fires causing slippery floors and stairs. Static charges on powders or powders in liquids may ignite combustible atmospheres. See NFPA Bulletin 654, "Prevention of Fires and Dust Explosions in the Chemical, Dye, Pharmaceutical, and Plastics Industries" for safe handling procedures.

SPECIAL FIREFIGHTING PRECAUTIONS/INSTRUCTIONS:

Wear self-contained breathing apparatus approved by NIOSH. Watch footing on floors and stairs because of possible melting and spreading of material. Use water spray to keep containers cool.

6. ACCIDENTAL RELEASE MEASURES**IN CASE OF SPILL OR OTHER RELEASES:** (Always wear recommended personal protective equipment.)

Remove ignition sources from the powdered grades. Keep away from heat or flame. Sweep up with a minimum of dusting. Collect in container, e.g. fiberboard drum or carton.

Spills and releases may have to be reported to Federal and/or local authorities. See the Regulatory Information section (#15) regarding reporting requirements.

7. HANDLING AND STORAGE**NORMAL HANDLING:** (Always wear recommended personal protective equipment.)

Under conditions of storage, vapors may collect in the headspace of the containers causing an odor (sometimes pungent) during unpacking of these products. Avoid breathing vapors when opening containers, and fumes from heating operations. Avoid spillage which can cause very slippery conditions on floors. Use good personal hygiene and housekeeping.

STORAGE RECOMMENDATIONS:

Avoid excessive heat. Do not store near strong oxidizing agents and amines.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION**ENGINEERING CONTROLS:**

Use adequate ventilation when opening product containers, during heating processes, or if dusty conditions prevail when handling powdered materials. For storage and ordinary handling, general ventilation is adequate.

PERSONAL PROTECTIVE EQUIPMENT:**SKIN PROTECTION:**

Protective garments, i.e. gloves with long sleeves, when handling molten material.

EYE PROTECTION:

Chemical goggles around molten material and in dusty conditions.

Honeywell

Material Safety Data Sheet

A-C® Oxidized Polyethylene Homopolymers

RESPIRATORY PROTECTION:

Use a NIOSH approved dust respirator with powdered grades if dusty conditions prevail. When opening product containers and during melting or conveying in molten state, use an organic vapor respirator.

ADDITIONAL RECOMMENDATIONS:

Not generally required.

EXPOSURE GUIDELINES: (Guidelines exist for the following ingredients)

Ingredient Name	ACGIH TLV	OSHA PEL	Other Limit
* No ingredients listed in this section *			

* = Limit established by Honeywell International

** = Workplace Environmental Exposure Level (AIIIA)

*** = Biological Exposure Index

Other exposure limits for the decomposition products normally associated with product use are as follows:

Powdered forms may generate nuisance particulates upon handling: ACGIH TLV = 10 mg/m3 of total particulates.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE:	A-C 6702 is grease-like; other grades are white pellets, prills, or powder.
PHYSICAL STATE:	Solid.
ODOR:	Characteristic waxy odor.
SPECIFIC GRAVITY:	(Water = 1.0) 0.85 - 1.00
SOLUBILITY IN WATER:	(Weight %) Negligible
pH:	Not applicable.
BOILING POINT:	Not applicable.
MELTING POINT:	88 - 140°C (190 - 284°F)
VAPOR PRESSURE:	Not applicable.
VAPOR DENSITY:	(Air = 1.0) Not applicable.
EVAPORATION RATE:	Not applicable. Compared to: Not applicable.
% VOLATILES:	Not applicable.
FLASH POINT:	> 490° (> 255°C)

(Flash point method and additional flammability data are found in Section 5.)

Honeywell

Material Safety Data Sheet

A-C® Oxidized Polyethylene Homopolymers

10. STABILITY AND REACTIVITY

NORMALLY STABLE? (Conditions to Avoid)

Stable at normal conditions.

INCOMPATIBILITIES:

Strong oxidizing agents and amines.

HAZARDOUS DECOMPOSITION PRODUCTS:

Depending on conditions of fire, CO, CO₂, and combustible gases may be generated.

HAZARDOUS POLYMERIZATION?

Will not occur.

11. TOXICOLOGICAL INFORMATION

IMMEDIATE (ACUTE) EFFECTS:

Acute oral toxicity in rats: LD50 > 2500 mg/kg.

DELAYED (SUBCHRONIC & CHRONIC) EFFECTS:

Not determined.

OTHER DATA:

No other data developed.

12. ECOLOGICAL INFORMATION

No data have been developed on this subject. These polymeric products are not soluble in water. They are not considered biodegradable.

13. DISPOSAL CONSIDERATIONS

RCRA:

Is the unused product a RCRA hazardous waste if discarded? No.

If yes, the RCRA ID number is:

OTHER DISPOSAL CONSIDERATIONS: Discard as non-hazardous organic solid waste.

The information offered here is for the product as shipped. Use and/or alteration to the product such as mixing with other materials may significantly change the characteristics of the material and alter the RCRA classification and the proper disposal method.

Honeywell

Material Safety Data Sheet

A-C® Oxidized Polyethylene Homopolymers

14. TRANSPORT INFORMATION

US DOT HAZARD CLASS: Not regulated.

US DOT ID NUMBER: Not applicable.

For additional information on shipping regulations affecting this material, contact the information number found on the first page.

15. REGULATORY INFORMATION

TOXIC SUBSTANCES CONTROL ACT (TSCA):

TSCA INVENTORY STATUS: Products are listed on the TSCA Chemical Inventory.

OTHER TSCA ISSUES: None.

SARA TITLE III/CERCLA:

RQs & TPQs

"Reportable Quantities" (RQs) and/or "Threshold Planning Quantities" (TPQs) exist for the following ingredients.

<u>Ingredient</u>	<u>SARA/CERCLA RQ (lbs)</u>	<u>SARA EHS TPQ (lbs)</u>
* No ingredients listed in this section *		

Spills/releases resulting in the loss of any ingredient at or above its RQ requires immediate notification to the National Response Center (1-800-424-8802) and to your Local Emergency Planning Committee.

SECTION 311 HAZARD CLASS: None

SARA 313 TOXIC CHEMICALS:

The following ingredients are SARA 313 "Toxic Chemicals". CAS #'s and wt. % are found in section #2.

<u>Ingredient</u>	<u>Comment</u>
* No ingredients listed in this section *	

STATE RIGHT TO KNOW:

In addition to the ingredients found in section 2, the following are listed for state right-to-know purposes:

<u>Ingredient</u>	<u>Wt.%</u>	<u>Comment</u>
* No ingredients listed in this section *		

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p. 22

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Material Safety Data Sheet

A-C[®] Oxidized Polyethylene Homopolymers

ADDITIONAL REGULATORY INFORMATION:

See Allied Technical Data Bulletin GEN-002 for FDA related information.

WHMIS CLASSIFICATION (CANADA):

Not subject to WHMIS regulations.

FOREIGN INVENTORY STATUS:

Canadian DSL (Domestic Substances List)

EINECS (European Inventory of Existing Commercial Chemical Substances)

Australian Chemical Inventory

Japanese Chemical Inventory

16. OTHER INFORMATION

CURRENT ISSUE DATE: 2/00

PREVIOUS ISSUE DATE: 3/98

CHANGES TO MSDS FROM PREVIOUS ISSUE DATE ARE DUE TO THE FOLLOWING:

Changed from AlliedSignal logo to Honeywell logo

OTHER INFORMATION: None